7. REGULATIONS AND ADVISORIES

The international, national, and state regulations and guidelines regarding vinyl chloride and other media are summarized in Table 7- 1.

ATSDR has derived three MRL values for vinyl chloride. An acute-duration inhalation MRL of 0.5 ppm was derived for vinyl chloride based on a NOAEL for developmental effects for mice (John et al. 1977, 1981). An intermediate-duration inhalation MRL of 0.03 ppm was derived for vinyl chloride based on increased relative liver weight in rats (Bi et al. 1985). A chronic-duration oral MRL of 0.00002 mg/kg/day was derived for vinyl chloride based on areas of cellular alteration in the livers of rats (Til et al. 1983, 1991). No EPA reference dose (RfD) or reference concentration (RfC) exists for vinyl chloride (IRIS 1995).

The FDA is responsible for regulating vinyl chloride as an indirect food additive. With regard to components of coatings, paper, and paperboard, the FDA states that when vinyl chloride is copolymerized with certain other substances, it is a safe food-contact surface. The amount of vinyl chloride content permitted varies depending on the nature of the polymer and its use (FDA 1994).

TABLE 7-1. Regulations and Guidelines Applicable to Vinyl Chloride

Agency	Description	Information	References
INTERNATIONAL			
IARC	Carcinogenic classification	Group 1[a]	IARC 1994
NATIONAL			
Regulations:			
a. Air:			
EPA	Concentration in exhaust gases from formation and purification of vinyl chloride shall not exceed[b]	10 ppm	EPA 1996c (38 FR 8820)
	Reactor opening loss from each reactor not to exceed (of polyvinyl chloride product)	0.02 g/kg	EPA 1996c (38 FR 8820)
	Concentration of vinyl chloride in an exhaust gas stream from polyvinyl reactors or strippers averaged over 3 hours not to exceed	10 ppm	EPA 1996c (38 FR 8820)
	Daily weighted average emission concentration of vinyl chloride from polyvinyl chloride product for dispersion resins (excluding latex resins) may not exceed	2.02 g/kg	EPA 1996c (38 FR 8820)
	Daily weighted average emission concentration of vinyl chloride from polyvinyl chloride product for dispersion resins (including latex resins) may not exceed	0.42 g/kg	EPA 1996c (38 FR 8820)
OSHA	PEL TWA	1 ppm	OSHA 1996 (53 FR 12120)
	STEL (15 minutes)	5 ppm	OSHA 1996 (53 FR 12120)
	Direct employee exposure to liquid vinyl chloride not allowed	Yes	OSHA 1996 (53 FR 12120)
b. Water:			
EPA ODW	MCL	0.002 mg/L	EPA 1996b
FDA	Quality standards for bottled water not to exceed	0.002 mg/L	FDA 1993 (58 FR 378-371)
c. Food:			
FDA	Indirect food additive for use only as a component of adhesives	Yes	FDA 1994 (42 FR 56728)
	Component of paper and paperboard in contact with aqueous and fatty foods	Yes	FDA 1994 (42 FR 14554)

TABLE 7-1. Regulations and Guidelines Applicable to Vinyl Chloride (*continued*)

Agency	Description	Information	References
NATIONAL (Cont.)			
d. Other:			
EPA OERR	Reportable quantity: CERCLA Statutory RQ	0.454 kg	EPA 1996e (50 FR 13474)
EPA OSW	Designated as a Toxic Pollutant under Section 307(a)(1) of the Federal Water Pollution Control Act	Yes	EPA 1994f (39 FR 4532)
	Designated as a Hazardous Substances under CERCLA	Yes	EPA 1996e (50 FR 13474)
	Listing as a Hazardous Waste: Heavy ends from distillation of vinyl chloride in vinyl chloride monomer production	Yes	EPA 1996d (45 FR 33119)
	Listing as a Hazardous Waste: Discarded commercial chemical products off-specification species, container residues, and spill residues thereof	Yes	EPA 1996a (45 FR 33119)
	Listing as a Hazardous Constituent	Yes	EPA 1996g (45 FR 33119)
	Designated as a Hazardous Air Pollutant under Section 112 of the Clean Air Act	Yes	EPA 1996f (38 FR 8820)
	Groundwater Monitoring Requirement	Yes	EPA 1993c (45 FR 33221)
EPA OTS	Toxic Chemical Release Reporting, Community Right-to-Know	Yes	EPA 1996h (53 FR 4525)
Guidelines			
a. Air:			
ACGIH	TLV TWA	13 mg/m^3, 5 ppm	ACGIH 1995
	STEL	No data	
	Carcinogenic Classification	Group A1[e]	
EPA	RfC (Inhalation)	No data	IRIS 1996
NIOSH	REL TWA: lowest reliably detectable concentration	Yes	NIOSH 1994c
b. Water:			
EPA ODW	MCLG	0	EPA 1996b
	Health Advisories:		
	1-day (child)	3.0 mg/L	
	10-day (child)	3.0 mg/L	
	Longer term (child)	0.01 mg/L	
	Longer term (adult)	0.05 mg/L	
	Lifetime	Not recommended	
EPA OWRS	Ambient Water Quality Criteria for Protection of Human Health[e]		EPA 1995 (48 FR 51405)
	Ingesting water and organisms: 10^{-6}	2.0 µg/L	EPA 1995 (48 FR 51405)

TABLE 7-1. Regulations and Guidelines Applicable to Vinyl Chloride (*continued*)

Agency	Description	Information	References
NATIONAL (Cont.)			
	Ingesting organisms only:		EPA 1995 (48 FR 51405)
	10^{-6}	525 µg/L	
	Drinking water:		EPA 1985b
	10^{-5}	1.5 µg/L	
	10^{-6}	0.15 µg/L	
	10^{-7}	0.015 µg/L	
c. Other:			
DHHS NTP	Is a known carcinogen	Yes	DHHS 1994
EPA	RfD (oral)	No data	IRIS 1996
	Carcinogen classification	Group A[d]	EPA 1994c
	Unit risk (inhalation)	8.4×10^{-5} $(\mu g/m^3)^{-1}$	EPA 1994d
	Unit risk (oral)	5.4×10^{-5} $(\mu g/L)^{-1}$	EPA 1994d
	q_1^* (inhalation)	2.95×10^{-1} $(mg/kg/day)^{-1}$	EPA 1985c
	q_1^* (oral)	2.3 $(mg/kg/day)^{-1}$	EPA 1985b
STATE			
Regulations and Guidelines:			
a. Air:			
	Acceptable Ambient Air Concentrations		NATICH 1996
Arizona	(1 hour)	17 µg/m^3	
Arizona	(24 hour)	4.4 µg/m^3	
Arizona	(Annual)	0.012 µg/m^3	
California	(NA)	0.0	
Connecticut	(8 hour)	50.0 µg/m^3	
Florida	(24 hour)	24.0 µg/m^3	
Florida	(8 hour)	100.0 µg/m^3	
Florida	(Annual)	0.14 µg/m^3	
Florida-Fort Lauderdale	(8 hour)	0.10 mg/m^3	
Kansas	(Annual)	0.244 µg/m^3	
Kansas	(Annual)	0.0238 µg/m^3	
Louisiana	(Annual)	1.19 µg/m^3	
Maine	(NA)	0.00	
Massachusetts	(24 hour)	3.47 µg/m^3	
Massachusetts	(Annual)	0.38 µg/m^3	
Maryland	(NA)	0.00	
Michigan	(Annual)	0.40 µg/m^3	
Nevada	(8 hour)	0.238 mg/m^3	
New York	(Annual)	0.400 µg/m^3	
North Carolina	(Annual)	0.00038 mg/m^3	
Oklahoma	(24 hour)	127.0 µg/m^3	
Pennsylvania-Philadelphia	(Annual)	2.57 ppb	
Pennsylvania-Philadelphia	(Annual)	2.40 ppb	
South Carolina	(24 hour)	50.0 µg/m^3	
South Dakota	(8 hour)	50.0 µg/m^3	
Texas	(30 minutes)	130.0 µg/m^3	
Texas	(Annual)	13.0 µg/m^3	

TABLE 7-1. Regulations and Guidelines Applicable to Vinyl Chloride (*continued*)

Agency	Description	Information	References
STATE (Cont.)			
Vermont	(Annual)	0.20 μg/m^3	
Virginia	(24 hour)	130.0 μg/m^3	
Washington	(Annual)	0.023 μg/m^3	
	Ambient Air Emissions Limitations for Class I areas (24-hour average)		
Kentucky		15 μg/m^3	CELDS 1990
Montana		15 μg/m^3	CELDS 1990
	Permit required to construct and operate an air contamination source project if yearly emissions exceed:		CELDS 1990
Arizona		1 ton	
Connecticut		1 ton	
Missouri		1 ton	
New York		1 ton	
Wisconsin		1 ton	
	Prevention of Significant Deterioration		
South Carolina	Adopted air pollution control standards found in EPA 1978 (40 CFR 52.21)	Yes	CELDS 1990
	Sources exempt from air monitoring requirements if net emissions increase is:		CELDS 1990
Delaware	(24 hour)	15 μg/m^3	
Louisiana	(24 hour)	15 μg/m^3	
Oregon	(24 hour)	15 μg/m^3	
Wisconsin	(24 hour)	15 μg/m^3	
Wisconsin	Hazardous Air Contaminants without Acceptable Ambient Concentrations requiring applications of Lowest Achievable Emission Rates	300 pounds/year	WAC 1988
Wisconsin	Exemption from requirement of Construction or Modification and New Operation Permits for Air Pollutant Sources if emissions do not exceed	1 ton/year	CELDS 1990
b. Water:			
	Drinking water quality guidelines and standards		FSTRAC 1990
Alabama		2 μg/L	
Arizona		2 μg/L	
California		0.5 μg/L	
Connecticut		2 μg/L	

TABLE 7-1. Regulations and Guidelines Applicable to Vinyl Chloride (*continued*)

Agency	Description	Information	References
STATE (Cont.)			
Florida		1 µg/L	
Kansas		2 µg/L	
Maine		0.15 µg/L	
Massachusetts		2 µg/L	
Minnesota		2 µg/L	
New Jersey		2 µg/L	
Rhode Island		2 µg/L	
Vermont		2 µg/L	
	MAL in drinking water		CELDS 1994
Oklahoma		0.002 mg/L	
	MCL in drinking water		CELDS 1994
Alabama		0.002 mg/L	
California		0.0005 mg/L	
Colorado		0.002 mg/L	
Connecticut		0.002 mg/L	
Florida		0.001 mg/L	
Georgia		0.002 mg/L	
Idaho		0.002 mg/L	
Illinois		0.002 mg/L	
Indiana		0.002 mg/L	
Iowa		0.002 mg/L	
Kentucky		0.002 mg/L	
Massachusetts		0.002 mg/L	
Missouri		0.002 mg/L	
Montana		0.005 mg/L	
Nebraska		0.002 mg/L	
New Jersey		0.002 mg/L	
New York		0.002 mg/L	
North Carolina		0.002 mg/L	
North Dakota		0.002 mg/L	
Ohio		0.002 mg/L	
Puerto Rico		0.002 mg/L	
Rhode Island		0.002 mg/L	
South Carolina		0.002 mg/L	
South Dakota		0.002 mg/L	
Tennessee		0.002 mg/L	
Texas		0.002 mg/L	
Utah		0.002 mg/L	
Virginia		0.002 mg/L	
West Virginia		0.002 mg/L	
Wisconsin		0.0002 mg/L	
	MCLG		CELDS 1994
Wisconsin		0.000015 mg/L	
Wisconsin	Public Health Groundwater Quality Standards:		
	Enforcement Standard	0.015 µg/L	WAC 1985
	Preventative Action Limit	0.0015 µg/L	WAC 1985
	Human Cancer Criteria		Wisconsin, Department of Natural Resources 1987

TABLE 7-1. Regulations and Guidelines Applicable to Vinyl Chloride (*continued*)

Agency	Description	Information	References
STATE (Cont.)			
	Public Water Supply		
	Warm water sport fish communities	0.15 µg/L	
	Cold water communities	0.15 µg/L	
	Great Lakes communities	0.15 µg/L	
	Nonwater Supply		
	Warm water sport fish communities	10 µg/L	
	Cold water communities	3.7 µg/L	
	Warm water forage and limited forage fish communities and limited aquatic life	30 µg/L	
c. Other:			
Kentucky	Listed as hazardous waste (from specific sources)	Yes	NREPC 1994 (401 KAR 31:040)

[a]Group 1: Carcinogenic to humans
[b]Applies to reactors, strippers, mixing, weighing, and holding containers and to monomer recovery systems
[c]Because of its carcinogenic potential, the EPA-recommended concentration for vinyl chloride in ambient water is zero. However, because attainment of this level may not be possible, levels which correspond to upper-bound incremental lifetime cancer risks of 10^{-5}, 10^{-6}, and 10^{-7} are estimated.
[d]Group A: Human carcinogen
[e]Group A1: Confirmed human carcinogen

ACGIH = American Conference of Governmental Industrial Hygienists; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; DHHS = Department of Health and Human Services; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; IARC = International Agency for Research on Cancer; MAL = Maximum Allowable Level; MCL = Maximum Contaminant Level; MCLG = Maximum Contaminant Level Goal; NA = not applicable; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; ODW = Office of Drinking Water; OERR = Office of Emergency and Remedial Response; OSHA = Occupational Safety and Health Administration; OSW = Office of Solid Wastes; OTS = Office of Toxic Substances; OWRS = Office of Water Regulations and Standards; PEL = Permissible Exposure Limit; REL = Recommended Exposure Limit; RfC = Reference Concentration; RfD = Reference Dose; RQ = Reportable Quantity; STEL = Short Term Exposure Limit; TLV = Threshold Limit Value; TWA = Time-Weighted Average